Long-Term Drivers of Future Mortality – A Podcast Series - Chapter 5 - Diseases

Mortality and Longevity

Podcast Transcript

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Long-Term Drivers, Future Mortality, Diseases, Infectious Diseases, Chronic Conditions, Mental Illness, Dementia, Emerging Health Threats, Cardiovascular Disease, Diabetes, Cancer, Antibiotic Resistance, Alzheimer's, Public Health, Medical Advances.

SPEAKERS

Al Klein, Erik Pickett, Kara Clark

TRANSCRIPT

KARA CLARK 00:05

Welcome Listeners to the Research Insights Podcast! I'm Kara Clark, Senior Practice Research Actuary at the Society of Actuaries Research Institute.

Welcome back to our special podcast series focusing on the paper *Long-Term Drivers of Future Mortality*, authored by Yair Babad and Al Klein for the 2023 Living to 100 Symposium.

Today, we are exploring Chapter Five, Diseases. I'm joined by two members of our Mortality & Longevity Steering Committee, Al Klein, one of the paper's authors and Principal and Consulting Actuary at Milliman. Welcome Al!

AL KLEIN 00:44

Thanks, Kara, and welcome everyone from near and far!

KARA CLARK 00:47

And also, Erik Pickett, Actuary and Chief Content Officer at Club Vita. Welcome Erik!

ERIK PICKETT 00:47

Hello, Hello! Yeah, it's great to be here!

KARA CLARK 00:56

As a quick reminder Listeners, if you want to download the paper, go to soa.org, click on the “Research Institute” tab and under "Research By Topic", click on "Mortality & Longevity." This will take you to the Mortality & Longevity landing page, where you will find a link to the paper and this podcast series.

And with that, I'll pass you over to Erik to start today's discussion on diseases.

ERIK PICKETT 01:21

Thanks very much Kara! Yeah, today we're discussing Chapter Five of the paper, which examines diseases as a key driver of future mortality. Infectious diseases, chronic conditions, mental illness, dementia and emerging health threats all play a critical role in shaping mortality trends.

AL KLEIN 01:40

Diseases have long been one of the more significant determinants of human mortality. Influencing life expectancy trends across populations, health care policies, insurance models and even social structures. As medical advancements have led to a decline in infectious disease mortality over the past century, the global health landscape has shifted towards a growing burden of non-communicable chronic and degenerative diseases. However, new and re-emerging infectious threats such as COVID-19, antibiotic-resistant bacteria and novel viruses highlight the continuing relevance of communicable diseases in mortality forecasting.

ERIK PICKETT 02:22

And from an actuarial perspective, understanding how disease patterns evolve is crucial for accurately projecting future mortality and morbidity rates. Changes in population demographics, lifestyle behaviors, socioeconomic conditions, medical research and public health initiatives all play a role in shaping disease prevalence and outcomes. So, some of the key questions we should be thinking about include:

- How will chronic diseases such as heart disease, diabetes and cancer impact mortality trends, and how will this be affected by an aging population?
- What lessons can we learn from the COVID-19 pandemic, and how can they be incorporated into future models regarding pandemics and infectious diseases? Will falling vaccine take-up and increased anti-microbial resistance increase future susceptibility to infectious diseases?
- How will mental health conditions and neurodegenerative diseases such as Alzheimer's affect longevity and long-term care needs?
- And what role will medical advances, such as new treatments and preventative measures play in mitigating mortality risks associated with diseases - all questions that we'll need to think about.

AL KLEIN 03:31

Thanks for those questions, Erik, by analyzing these factors and drivers, actuaries can better anticipate shifts in disease related mortality, refine longevity projections and assess the long-term financial risks associated with

pensions, life insurance and health care costs. As we explore Chapter Five, we'll examine how different categories of diseases are shaping mortality trends and what considerations actuaries should keep in mind.

We'll start with one of the most impactful disease categories, non-communicable chronic diseases. Erik, can you start us on this discussion?

ERIK PICKETT 04:08

Sure Al, yeah, I can. So non-communicable chronic diseases, such as cardiovascular disease, diabetes, cancer, these are all among leading causes of death globally. And as populations age, the burden of these diseases is expected to grow.

Cardiovascular disease is the number one cause of death worldwide, so the progress of treating this disease, or its causes, will have a large impact on how mortality rates develop in the future.

In fact, cardiovascular disease used to be an even bigger problem than it is today. We saw rapid improvements in mortality rates due to cardiovascular disease from around the 1960s to around 2010, especially in western-developed nations like the U.S. These improvements are commonly attributed to decreases in smoking rates, the introduction of statins, and improvements in treatments.

Since the 2010s improvements in cardiovascular disease and mortality have actually stalled to a large extent, and in some countries, we've even seen increases in recent years. It seems we may have taken much of the low-hanging fruit for dealing with this condition.

The continued mortality improvements due to cardiovascular disease up to around 2010 were in fact a large driver of high overall mortality improvements in the first decade of this century. Those high improvements were incorporated into a lot of the trend models from about 10 to 15 years ago, such as the CMI_2012 model and the MP_2014 model. And these models projected high levels of ongoing mortality improvements, which at the time drew a lot of debate. Since then, in the period running up to the COVID-19 pandemic, we saw overall mortality improvements drop, which is at least partially driven by the leveling off in pre-pandemic improvements in cardiovascular disease. And this has resulted in later calibrations of those models I mentioned projecting lower levels of ongoing mortality improvements.

And as is often the case, these results vary by country, but the developments in outcomes of cardiovascular disease remain really important for understanding drivers of future mortality

AL KLEIN 06:19

Erik, that history was interesting!

As you said, cardiovascular disease remains the number one cause of death worldwide. While reductions in smoking rates and medical advancements have led to better survival rates, lifestyle factors such as poor diet, physical inactivity and obesity continue as persistent risk factors.

Next, let's discuss diabetes.

ERIK PICKETT 06:42

Sure - diabetes is another major concern. Type 2 diabetes rates are rising due to increasing obesity levels and sedentary lifestyles. This condition contributes to complications such as kidney disease, nerve damage and cardiovascular issues, further impacting longevity. New treatments such as GLP-1 receptor agonists are showing real promise in managing diabetes and obesity, but their long-term impact on mortality is still uncertain.

Moving on then, Al, what about cancer?

AL KLEIN 07:14

Cancer trends are more complex, while screening programs and treatments have improved survival rates for some cancers, others remain highly lethal. The effectiveness of early detection and advances in immunotherapy may lead to improvements in some cancer outcomes, but access to these treatments is not uniform across populations, and some of the new treatments are still being developed. Actuaries must assess how changes in cancer detection, prevention and treatment affect the populations they are modeling.

ERIK PICKETT 07:45

Yeah, thanks for that. While chronic diseases dominate mortality statistics, infectious diseases remain a major concern. Many infectious diseases can be effectively managed with vaccination programs. Widespread immunization has significantly reduced deaths from diseases like measles and polio, but vaccine hesitancy and new virus and viral mutations remain challenges for disease control.

AL KLEIN 08:12

The COVID-19 pandemic recently demonstrated how rapidly a new infectious disease can alter mortality trends on a global scale. Poor and slow communication, related to both data reporting and strategic approaches, also led to the spread as healthcare professionals were trying to determine what to do and how to treat the virus. The long-term impact of COVID-19, including complications such as Long COVID also remains an area of interest and active research.

ERIK PICKETT 08:42

And emerging threats such as anti-microbial resistance could also shape future mortality outcomes. If common bacterial infections become harder to treat due to antibiotic resistance, mortality rates for conditions once considered manageable may rise.

AL KLEIN 08:58

Exactly Erik! And it could possibly be even worse than what we saw with COVID-19. In a worst-case scenario, what are currently considered common infections could become deadly!

When modeling future mortality rates, actuaries will have a few key considerations for infectious diseases:

- First, the ongoing efforts to prevent or treat existing infectious diseases. This includes the possible re-emergence of existing infectious diseases thought previously to be under control, potentially driven by a reduction in the efficacy of treatments or lower levels of immunization within the population. And maybe even more problematic is if this re-emergence takes a new form, rendering known treatments to be less effective or not effective at all.
- And second, the emergence of new infectious diseases and possibly new pandemics. This includes the potential for lingering health complications in survivors, health care system strain and the potential need for rapid shift in public health policies.

Next, let's discuss neurodegenerative diseases. These diseases such as Alzheimer's and Parkinson's are an increasing concern as populations age. The conditions from these diseases don't just impact longevity, but also, maybe even more importantly, the quality of life and healthcare needs and costs. A recent article in The Lancet is projecting

more than double the number of global dementia-related cases by 2050. And I've seen this level of projection elsewhere too.

This presents a significant challenge for healthcare systems worldwide. But it should be noted that some countries and regions have seen tremendous growth in neurological diseases, while others have seen a slowing or even reversal. This probably aligns with the general healthiness and rate of aging of each population.

ERIK PICKETT 10:52

Yeah, thanks Al! While I agree with you on that, I think Alzheimer's disease in particular is a growing issue. With no cure currently available, the number of individuals affected is projected to rise dramatically in aging populations. This has significant implications for long-term care needs, caregiving burdens and overall mortality projections. Once promising treatments targeting amyloid plaques have shown mixed results, but more research is needed here.

AL KLEIN 11:20

I think the key question is whether medical advances will slow the progression of these diseases, or if they will continue to be an increasing driver of future mortality. If breakthroughs in prevention or treatment emerge, they could reduce the burden on health care facilities, and, from an actuarial standpoint, have a profound impact on longevity forecasting.

ERIK PICKETT 11:42

So, moving on to mental health now, then, mental health is an increasingly recognized factor in overall mortality trends. Conditions such as depression, anxiety and substance use disorders can have significant long-term impacts on both physical and mental well-being. It can also impact family members and others in terms of both health and longevity. The stigma surrounding mental health issues often results in under diagnosis or under treatment, exacerbating the problem.

AL KLEIN 12:11

Suicide and drug overdose deaths have risen in many regions, particularly among younger and middle-aged adults. The opioid crisis in particular, has dramatically impacted mortality rates in certain demographics. Understanding the broader implications is critical. The role of economic uncertainty and social isolation with increasing mental health issues must also be considered.

ERIK PICKETT 12:36

And also, the relationship between mental health and physical health - that can't be overlooked! Chronic stress and untreated mental illness can contribute to higher risks of cardiovascular disease, weakened immune system and unhealthy behaviors like smoking, poor diet and in some cases, harm to the self or others. Actuaries need to consider the long-term effects of mental health trends on mortality projections.

AL KLEIN 13:02

One last item that was touched on at the end of the chapter was the potential for an unknown disease with an unknown outcome hitting one or more populations. This has an extremely low probability of occurrence, but a potentially significant impact, and is something that is impossible to model up front. However, being aware of this possibility can potentially help in more quickly being able to adjust your models when an unlikely event does occur.

ERIK PICKETT 13:30

So, Listeners, we've now touched on the key areas of the chapter, and we hope this gives you a good overview of disease considerations for future mortality. To finish this session off, Al, as usual, would you like to run through the summary of how you and Yair saw the likely impact of diseases for the general population?

AL KLEIN 13:49

Yes, of course Erik! As a reminder, at the end of each chapter, Yair and I included a table where we highlight the outlook for the impact on future mortality expectations of the different areas covered in the chapter. The key disease-related drivers included in the table for this chapter were:

- Infectious and vector-borne diseases,
- chronic diseases,
- hereditary, which we didn't discuss today,
- mental health,
- dementia, Alzheimer's,
- pandemics,
- medical treatments,
- and public infrastructure.

The largest change we predicted was from improvements in public infrastructure such as clean water and sanitation in developing countries.

We also predicted some small improvements in outcomes for infectious and vector-borne diseases and medical treatments.

We predicted a small deterioration in outcomes for chronic diseases, mental health, dementia and Alzheimer's, as well as future pandemics.

ERIK PICKETT 14:47

To summarize today's discussion, then:

- Chronic diseases will continue to be a dominant driver of mortality, with trends influenced by both lifestyle choices and medical advances.
- Infectious diseases remain a major concern with pandemics, vaccine hesitancy and anti-microbial resistance posing long-term risks.
- Dementia and Alzheimer's are on the rise, requiring careful consideration in mortality modeling and
- Actuaries must monitor medical progress and public health interventions and adjust mortality projections accordingly.

AL KLEIN 15:18

It was a great summary, Erik. Understanding how disease trends evolve is crucial for more accurate risk assessment and mortality forecasting.

Back to you, Kara, to let the Listeners know about our next podcast and to close us out.

KARA CLARK 15:33

Thanks, Al and Erik! That's all for today's episode. Join us at the end of next month for our next episode, which explores another key driver of future mortality, health care.

We'd love to hear your feedback on this podcast series and thoughts on topics for future research by emailing us at Research-ML@soa.org Your feedback helps us better serve you.

Thank you all for joining us on our chapter-by-chapter journey through the Long-Term Drivers of Future Mortality Podcast series. We appreciate your support and engagement!

For the Mortality and Longevity Steering Committee and the Research Insights Podcast, I'm Kara Clark for the Society of Actuaries Research Institute.

ROSE NORTHON 15:20

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